

WHAT IS CLAIMED IS:

1. An ultraviolet (UV) curable electroluminescent composition comprising:

at least one aliphatic acrylated oligomer;

an isobornyl acrylate monomer;

a photoinitiator; and

an electroluminescent phosphor, wherein upon exposure to UV light the electroluminescent composition cures into a layer suitable for use as the active layer in an electroluminescent device and wherein the electroluminescent composition does not contain any significant amount of volatile organic solvents that do not become incorporated in the coating after the electroluminescent composition is cured.

2. The UV curable electroluminescent composition of claim 1, wherein,

the aliphatic acrylated oligomer mixture is present in an amount of about 10% to 40% of the weight of the electroluminescent composition;

the isobornyl acrylate monomer is present in an amount of about 4% to 30% of the weight of the electroluminescent composition;

the photoinitiator is present in an amount of about 0.5% to 6% of the weight of the electroluminescent composition; and

the phosphor is present in an amount of about 28% to 80% of the weight of the electroluminescent composition.

3. The UV curable electroluminescent composition of claim 2, wherein the at least one aliphatic acrylated oligomer is at least one urethane oligomer.

4. The UV curable composition of claim 2 further comprising: an adhesion promoter in an amount of about 1% to 10% of the weight of the composition; and

a flow promoting agent in an amount of 0.1 % to 5% of the weight of the electroluminescent composition.

5. The UV curable composition of claim 4 wherein:

the aliphatic acrylated oligomer mixture is present in an amount of
5 about 34 % of the weight of the electroluminescent composition;

the isobornyl acrylate monomer is present in an amount of about 20% of the weight of the electroluminescent composition;

the photoinitiator is present in an amount of about 3 % of the weight of the electroluminescent composition;

10 the phosphor is present in an amount of about 33 % of the weight of the electroluminescent composition;

the adhesion promoter in an amount of about 7% of the weight of the composition; and

15 the flow promoting agent in an amount of 3% of the weight of the electroluminescent composition.

6. The UV curable composition of claim 4 wherein:

the aliphatic acrylated oligomer mixture is present in an amount of about 12% of the weight of the electroluminescent composition;

20 the isobornyl acrylate monomer is present in an amount of about 8% of the weight of the electroluminescent composition;

the photoinitiator is present in an amount of about 1 % of the weight of the electroluminescent composition;

25 the phosphor is present in an amount of about 75% of the weight of the electroluminescent composition;

the adhesion promoter in an amount of about 3% of the weight of the composition; and

the flow promoting agent in an amount of 1% of the weight of the electroluminescent composition.

30 7. The electroluminescent composition of claim 1 wherein the aliphatic acrylated oligomer in the mixture is selected from the group consisting of:

a) aliphatic urethane diacrylate diluted 10% by weight with 1,6-hexanediol diacrylate;

b) aliphatic urethane triacrylate diluted 15% by weight with 1,6-hexanediol diacrylate;

5 c) aliphatic urethane diacrylate blended with 20% by weight tripropylene glycol diacrylate;

d) aliphatic urethane diacrylate blended with 25% by weight ethoxylated trimethylol propane triacrylate;

10 e) aliphatic urethane diacrylate blended with 19% by weight 2-(2-ethoxyethoxy)ethyl acrylate;

f) aliphatic urethane diacrylate blended with 20% by weight tripropylene glycol diacrylate;

g) aliphatic urethane diacrylate blended with 20% by weight tripropylene glycol diacrylate;

15 h) aliphatic urethane diacrylate blended with 25% by weight tripropylene glycol diacrylate;

i) aliphatic urethane diacrylate; and

j) mixtures thereof.

20 8. The electroluminescent composition of claim 1 wherein the isobornyl acrylate monomer in the mixture is selected from the group consisting of isobornyl acrylate, isobornyl methacrylate, and mixtures thereof.

25 9. The electroluminescent composition of claim 1 wherein the photoinitiator is selected from the group consisting of:

1-hydroxycyclohexyl phenyl ketone;

2-methyl-1-[4-(methylthio)phenyl]-2-morpholino propan-1-one;

the combination of 50% 1-hydroxy cyclohexyl phenyl ketone and 50% benzophenone;

30 2,2-dimethoxy-1,2-diphenylethan-1-one;

the combination of 25% bis(2,6-dimethoxybenzoyl-2,4-, 4-trimethyl pentyl phosphine oxide and 75% 2-hydroxy-2-methyl-1-phenyl-propan-1-one;

2-hydroxy-2-methyl-1-phenyl-1-propane;

the combination of 50% 2,4,6-trimethylbenzoyldiphenyl-phosphine oxide and 50% 2-hydroxy 2-methyl-1-phenyl-propan-1-one;
mixed triaryl sulfonium hexafluoroantimonate salts;
mixed triaryl sulfonium hexafluorophosphate salts; and
mixtures thereof.

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10. A method for coating a substrate with an electroluminescent composition, the method comprising:

applying the electroluminescent composition to the substrate, wherein the electroluminescent composition includes:

10 an aliphatic acrylated oligomer mixture in an amount of about 10% to 40 % of the weight of the composition;

an isobornyl acrylate monomer in an amount of about 4 % to 30% of the weight of the composition;

15 an photoinitiator in an amount of about 0.5% to 6% of the weight of the composition;

an adhesion promoter in an amount of about 1% to 10% of the weight of the composition;

a flow promoting agent in an amount of 0.1 % to 5% of the weight of the electroluminescent composition; and

20 an electroluminescent phosphor in an amount of about 28 % to 80% of the weight of the composition; and

illuminating the electroluminescent composition on the substrate with an UV light sufficient to cause the electroluminescent composition to cure into a layer suitable for use as the active layer of an electroluminescent device.

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11. The method of claim 10, wherein the UV light used in illuminating impinges upon the electroluminescent composition so that the electroluminescent composition is caused to form the coating it cures.

30 12. The method of claim 10, wherein the method of applying the electroluminescent composition is spraying.

13. The method of claim 10, wherein the method of applying the electroluminescent composition is screen-printing.

14. The method of claim 10, wherein the method of applying the electroluminescent composition is dipping the substrate into the composition
5 sufficiently to cause the composition to uniformly coat the substrate.

15. The method of claim 10, wherein the method of applying the electroluminescent composition is brushing.

16. The method of claim 10, wherein the method of applying the electroluminescent composition is selectively depositing to the substrate at
10 predetermined locations.

17. A method of a substrate with an ultraviolet (UV) curable electroluminescent composition to form a electroluminiscent coating comprising:
applying the electroluminescent composition to the substrate,
15 wherein the composition includes:

an aliphatic acrylated oligomer mixture in an amount of about 10% to 40% of the weight of the electroluminiscent composition;

an isobornyl acrylate monomer in an amount of about 4% to 30% of the weight of the electroluminescent composition;

20 a photoinitiator in an amount of about 0.5% to 6% of the weight of the electroluminescent composition;

a flow promoting agent in an amount of 0.1% to 5% of the weight of the electroluminescent composition; and

25 an electroluminescent phosphor in an amount of about 28% to 80% of the weight of the electroluminescent composition; and

illuminating the electroluminescent composition on the substrate with an UV light sufficient to cause the electroluminescent composition to cure into a layer suitable for use as the active layer of an electroluminescent device.

18. The method of claim 17, wherein,
the aliphatic acrylated oligomer mixture is about 34% of the weight
of the electroluminescent composition;

the isobornyl acrylate monomer is about 20% of the weight of the
electroluminescent composition;

the photoinitiator is about 3% of the weight of the electroluminescent
composition;

the flow promoting agent is about 3% of the weight of the
electroluminescent composition; and

the phosphor is about 33% of the weight of the electroluminescent
composition.

19. The method of claim 17, wherein,
the aliphatic acrylated oligomer mixture is about 12% of the weight
of the electroluminescent composition;

the isobornyl acrylate monomer is about 8% of the weight of the
electroluminescent composition;

the photoinitiator is about 1% of the weight of the electroluminescent
composition;

the flow promoting agent is about 1% of the weight of the
electroluminescent composition; and

the phosphor is about 75% of the weight of the electroluminescent
composition.

20. A method of preparing an ultraviolet (UV) curable
electroluminescent composition comprising:

combining an isobornyl acrylate monomer and a photoinitiator in a
pan to form a first combination;

mixing the first combination;

combining an aliphatic acrylated oligomer mixture and flow
promoting agent with the first mixture to form a second combination;

mixing the second combination;

combining an electroluminescent phosphor and an adhesion promoter with the second mixture to form a third combination; and mixing the third combination.

5 ~~21. A UV curable electroluminescent composition of claim 1,~~
wherein the electroluminescent phosphor comprises a sulfide electroluminescent phosphor.

22. A UV curable electroluminescent composition of claim 21,
wherein the electroluminescent phosphor comprises a zinc sulfide electroluminescent phosphor.

10 23. A UV curable electroluminescent composition of claim 22,
wherein the electroluminescent phosphor comprises a copper activated zinc sulfide electroluminescent phosphor.

15 ~~24. A UV curable electroluminescent composition of claim 1,~~
wherein the electroluminescent phosphor is present in an amount between about 28% to 80% of the weight of the electroluminescent composition.

20 25. An ultraviolet (UV) curable electroluminescent composition comprising:
at least one aliphatic acrylated oligomer;
an isobornyl acrylate monomer;
a photoinitiator; and
a phosphor, wherein upon exposure to UV light the electroluminescent composition cures into a layer suitable for use as the active layer in an electroluminescent device and wherein the electroluminescent composition does not contain any significant amount of volatile organic solvents that do not become incorporated in the coating after the electroluminescent composition is cured; and
25 the phosphor is present in an amount of about 28% to 80% of the weight of the electroluminescent composition.